Given $3 \leq n \leq 10$ distinct points (x, y) with integer coordinates, Mohammad wants to find a polygon with minimum area which has these points as its vertices. However, he would have liked to minimize the polygon perimeter as well. He is curious to know how long on perimeter he is compromising to get the smallest-area polygon.

Input

An integer T as the number of test-cases is given on the first line. Each test-case consists of an integer n, on a single line, as the number of points. For the following n lines, x and y coordinates of the points are given as two integers $(0 \leq x, y \leq 100)$.

Output

Print on a single line per test-case, the difference between the perimeters of the minimum-area polygon and the minimum-perimeter polygon. Round the results to 4 decimal places.

Sample Input

```
2
3
1 1
1 2
2 1
4
0 0
1 1
0 2
2 1
```

Sample Output

```
0.0000
0.6503
```